DOCUMENT RESUME

ED 305 605 CS 009 600

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TITLE Answering Questions after Reading: The Effects of Reader and Task Interactions on Reading Comprehension.
PUB DATE Mar 89
NOTE 12p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, March 27-31, 1989).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Analysis of Variance; Comparative Analysis; Elementary Education; *Field Dependence Independence; Grade 6; Grade 7; Grade 8; *Independent Reading; *Questioning Techniques; *Reading Comprehension; *Reading Processes; Reading Research
IDENTIFIERS Group Embedded Figures Test; Stanford Achievement Tests

ABSTRACT

In an effort to predict whether field dependent readers would be adversely affected by postreading tasks involving high memory demands and requiring restructuring skills, a study assessed how the field dependent-independent cognitive style may be related to performance on reading comprehension question tasks for school-age learners. Subjects, 55 field independent and 56 field dependent sixth-eighth grade students scoring between 5.0 and 7.9 grade equivalent on the Stanford Achievement Test, were given comprehension question tasks for a series of passages. Results showed that field independent readers outperformed field dependent readers on tasks with high memory demands and with requirements for efficient restructuring skills. Findings also showed that field independent subjects were more successful than field dependent subjects on free-response questions under the condition of no-textbacktracking. (One table of data and one figure are included.) (MS)

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Answering Questions After Reading: The Effects of Reader and Task Interactions on Reading Comprehension

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CS009600

Abstract

In this study, field dependent and field independent school-age readers were assessed on reading comprehension question tasks varying in degree of memory load (text reinspection permitted or not permitted during question answering) and cognitive restructuring requirements (multiple-choice, free-response question formats). Based upon field dependent-independent theory it was predicted that field independent readers would outperform field dependent readers on tasks with high memory demands and with requirements for efficient restructuring skills. The results supported this hypothesis. Field independent subjects were more successful than field dependent subjects on free-response questions under the condition of no-textbacktracking. Implications are drawn for future studies of individual differences in reading comprehension processes, for assessment practices, and for instruction design.

Answering Questions After Reading: The Effects of Reader and Task Interactions on Reading Comprehension

The purpose of this study was to assess how the field dependent-independent cognitive style may be related to performance on reading comprehension question tasks for school-age learners. Although ample study over the years has documented global differences between field dependent and field independent individuals on a variety of academic tasks, until recently research has been relatively meager concerning the underlying reading process components which may be affected by cognitive style differences. In this study, differences between field dependent and field independent readers were examined relative to their performance on multiple-choice and free-response comprehension questions, assessed with and without the passage available during question-answering. Based upon field dependent-independent theory (Davis and Frank, 1979), it was predicted that field dependent readers would be adversely affected by postreading tasks involving high memory demands and requiring restructuring skills.

Method

Subjects

Subjects consisted of 55 field independent and 56 field dependent 6th-8th grade students, all scoring between 5.0 and 7.9 grade equivalent on the Stanford Achivement Test (Reading Comprehension Subtest), and all consenting to participate in the study. This final sample represented the top-scoring third (field independent) and the bottom-scoring third (field dependent) of those who took a modified version of the Group Embedded Figures Test (Lockheed, et al., 1977; Witkin, et al., 1971). This task requires individuals to identify, by pencil-outlining, a target shape within a complex design. Subjects must hold the stimulus form in memory while looking back to the design context; the task is timed. One subject did not complete the experimental tasks and thus was eliminated from

the final analysis, dropping the field independent group size from 56 to 55 individuals. Preliminary analyses revealed no significant differences between mean SAT scores for the two groups, t (109) = .82.

Materials

Twelve passages of approximately 250-300 words in length were utilized in this study. All passages were informational in type, modified from the Standard Test Lessons in Reading (McCall & Crabbs, 1961), and were determined to be of about 5th grade reading difficulty (Fry, 1977). Two comprehension question tasks were constructed for each passage. One task involved a four-option multiple-choice format, administered both with and without text-backtracking permitted. The second task consisted of a free-response question format, again administered both with and without a text-backtracking conditions. The question stems were identical for both multiple-choice and free-response versions. The eight questions which accompanied each passage assessed relatively text-implicit information; that is, correct answers could not be located directly in the passages, but were implied by the text language. Passages with acompanying question tasks were grouped into triads in order to have sufficient items for adequate reliabilities, resulting in 24 items for each question task for each subject.

All subjects eventually read each passage triad under a different task condition: multiple-choice, text-backtracking; multiple-choice, no text-backtracking; free-response, text-backtracking; free-response, no text-backtracking. This design allowed for descriptions of cognitive style effects and interactions for the two task variables of interest: question format and text-backtracking condition. Assignment of triads to task conditions was counterbalanced and assignment to individual subjects was randomly determined. All question tasks included practice and warm-up items and were administered in untimed settings.

Results

A multifactor repeated measures analysis of variance was implemented with one between-subjects factor: Cognitive Style (field dependent, field independent), and two

within-subjects factors: Question Format (multiple-choice, free-response), and Text-Backtracking Condition (backtracking, no-backtracking). All tests of significance were conducted at the .05 level. Means and standard deviations are reported in Table 1.

Insert Table 1 About Here

All main effect analyses were statistically significant except for Cognitive Style, $F(1,109) = 1.35$. Not surprisingly, mean scores on multiple-choice questions exceeded those on free-response questions, $F(1, 109) = 68.89$, $p \leq .05$, and text-backtracking resulted in higher scores than when no backtracking was permitted, $F(1,109) = 133.89$, $p \leq .05$. In addition, several interaction effects were statistically significant.

Of interest was the significant two-way interaction involving Cognitive Style and Question Format, $F(1,109) = 8.48$, $p \leq .05$. Tests of simple effects for Cognitive Style groups using Tukey's HSD procedure revealed that the difference between multiple-choice and free-response scores was greater for field dependent than for field independent subjects. Likewise, the two-way interaction of Question Format and Text -Backtracking was statistically significant, $F(1,109) = 50.98$, $p \leq .05$, and Tukey's HSD procedure indicated that the difference between multiple-choice and free-response scores was greater for no-backtracking than for backtracking.

Finally, the three-way interaction effect of Cognitive Style, Question Format, and Text-Backtracking was statistically significant, $F(1,109) = 4.10$, $p \leq .05$ (see Figure 1).

Insert Figure 1 About Here

In this interaction, the discrepancy between multiple-choice and free-response scores differed for the Text-Backtracking condition depending on Cognitive Style. Tukey's HSD procedure was used again to test for significant differences between pairs of means for simple effects. Whereas the magnitude of differences between question scores for backtracking and no-backtracking did not differ for the field dependent and independent

readers answering multiple-choice questions, significant differences were found between field dependent and field independent groups on free-response questions. Specifically, the discrepancy between backtracking and no-backtracking on free-response items was greater for field dependent than for field independent readers. Although these free-response question scores were comparable between field dependent and field independent subjects when permitted to text-backtrack, the scores of field dependent readers dropped dramatically when not allowed to look back to the text.

Implications

The field dependence-independence cognitive style has been shown to be an important individual difference variable in many aspects of psychological functioning relevant to issues of learning and instruction (Witkin & Goodenough, 1981; Witkin, Moore, Goodenough & Cox, 1977). This study illustrated how the field dependence-independence cognitive style may be particularly informative in expanding our understandings of the dynamic interactions between readers and tasks in comprehension outcomes. Given the vast amount of research activity over the past ten years concerning reading comprehension, it is somewhat surprising that we have relatively little understanding of how individual differences in cognitive processes may affect reading performance (Spiro & Myers, 1984). It is anticipated that our increasing specification of comprehension processes and underlying components will lead to a variety of important individual difference studies in thes future.

A clear practical implication of the findings from this study concerns the assessment of reading comprehension. It appears that free-response questions without passages available for reinspection are not tapping comparable processes across groups differing in cognitive style. This suggests caution when generalizing findings from reading comprehension studies employing certain item characteristics to students with varying cognitive styles and to assessment outcomes using different item characteristics. It also suggests that certain cognitive style groups may be advantaged or disadvantaged by certain test characteristics in reading comprehension assessment -- an issue of test-bias.

Finally, the particular relevance of the field dependent-independent cognitive style for educators may lie in its effect on encouraging teachers to recognize and appreciate the cognitive diversity among students, and to acknowledge that there is no "right way" to orchestrate reading and learning experiences for all children. It is hoped that future individual difference research concerning the cognitive characteristics of school-age readers will prove to be particularly informative for elaborating our understandings of highly complex comprehension processes.

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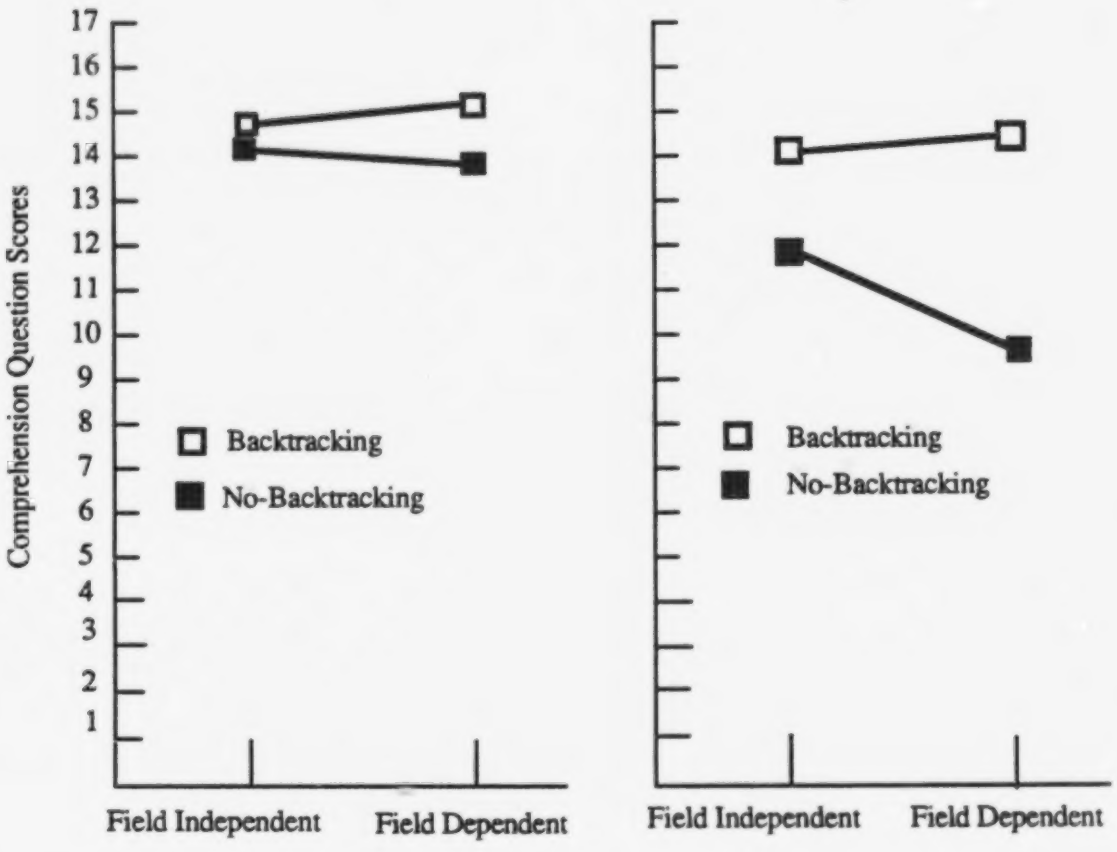
Table 1

Means and Standard Deviations (in parentheses) for Comprehension Question Tasks

	Field Independent	Field Dependent
MC - TB	14.97 (7.99)	15.16 (3.99)
MC - NTB	14.02 (4.58)	13.73 (3.63)
FR - TB	14.21 (4.77)	14.67 (3.83)
FR - NTB	11.88 (5.36)	9.31 (4.64)

Note. MC = multiple-choice; FR = free-response; TB = text-backtracking; NTB = no text-backtracking.

Figure 1. Interaction effects for cogniive style, question format, and text-backtracking conditions.



Multiple-Choice

Free-Response